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Instruction Manual

MultiPower 460
Pulse Control Panel Kit

P/N 0558002671

Installation and Operation Instructions

CAUTION

Read and understand the entire contents of this manual, the power source manual, and the wire feeder manual used with this unit. Special emphasis should be given to the safety material throughout all manuals, before installation, operation, or maintenance of this equipment. This unit and these instructions are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate, or maintain this unit. Contact your distributor if you do not fully understand these instructions.

Be sure this information reaches the operator.
You can get extra copies through your supplier.

ESAB® ESAB Welding & Cutting Products

USER RESPONSIBILITY

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Defective equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, the manufacturer recommends that a telephone or written request for service advice be made to the Authorized Distributor from whom it was purchased.

This equipment or any of its parts should not be altered without the prior written approval of the manufacturer. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than the manufacturer or a service facility designated by the manufacturer.

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SAFETY PRECAUTIONS

WARNING: These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.

PROTECT YOURSELF AND OTHERS -- Some welding, cutting, and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equipment is essential to prevent accidents. Therefore:

1. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, and goggles are also required.
2. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck, and ears from sparks and rays of the arc when operating or observing operations. Warn bystanders not to watch the arc and not to expose themselves to the rays of the electric-arc or hot metal.
3. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
4. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing
5. Protect other personnel from arc rays and hot sparks with a suitable nonflammable partition or curtains.
6. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly far. Bystanders should also wear goggles over safety glasses.

FIRES AND EXPLOSIONS -- Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

1. Remove all combustible materials well away from the work area or cover the materials with a protective nonflammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
2. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal.“
3. Do not weld, cut or perform other hot work until the workpiece has been completely cleaned so that there are no substances on the workpiece which might produce flammable or toxic vapors. Do not do hot work on closed containers. They may explode.
4. Have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher. Be sure you are trained in its use.
5. Do not use equipment beyond its ratings. For example, overloaded welding cable can overheat and create a fire hazard.
6. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.
7. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

ELECTRICAL SHOCK -- Contact with live electrical parts and ground can cause severe injury or death. DO NOT use AC welding current in damp areas, if movement is confined, or if there is danger of falling.

1. Be sure the power source frame (chassis) is connected to the ground system of the input power.
2. Connect the workpiece to a good electrical ground.
3. Connect the work cable to the workpiece. A poor or missing connection can expose you or others to a fatal shock.
4. Use well-maintained equipment. Replace worn or damaged cables.
5. Keep everything dry, including clothing, work area, cables, torch/electrode holder, and power source.
6. Make sure that all parts of your body are insulated from work and from ground.
7. Do not stand directly on metal or the earth while working in tight quarters or a damp area; stand on dry boards or an insulating platform and wear rubber-soled shoes.
8. Put on dry, hole-free gloves before turning on the power.
9. Turn off the power before removing your gloves.
10. Refer to ANSI/ASC Standard Z49.1 (listed on next page) for specific grounding recommendations. Do not mistake the work lead for a ground cable.

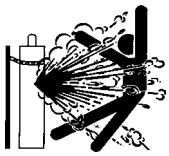
ELECTRIC AND MAGNETIC FIELDS — May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:

1. Welders having pacemakers should consult their physician before welding. EMF may interfere with some pacemakers.
2. Exposure to EMF may have other health effects which are unknown.
3. Welders should use the following procedures to minimize exposure to EMF:
   A. Route the electrode and work cables together. Secure them with tape when possible.
   B. Never coil the torch or work cable around your body.
   C. Do not place your body between the torch and work cables. Route cables on the same side of your body.
   D. Connect the work cable to the workpiece as close as possible to the area being welded.
   E. Keep welding power source and cables as far away from your body as possible.

SAFETY PRECAUTIONS

FUMES AND GASES -- Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Do not breathe fumes and gases. Shielding gases can cause asphyxiation. Therefore:

1. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes from these materials.
2. Do not operate near degreasing and spraying operations. The heat or arc rays can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas, and other irritant gases.
3. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
4. Refer to ANSI/ASC Standard Z49.1 (see listing below) for specific ventilation recommendations.
5. **WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code §25249.5 et seq.)**



CYLINDER HANDLING -- Cylinders, if mishandled, can rupture and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Therefore:

1. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting regulator to a compressed gas cylinder.
2. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, undercarriages, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
3. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.
4. Locate cylinders away from heat, sparks, and flames. Never strike an arc on a cylinder.
5. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

EQUIPMENT MAINTENANCE -- Faulty or improperly maintained equipment can cause injury or death. Therefore:

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not perform any electrical work unless you are qualified to perform such work.
2. Before performing any maintenance work inside a power source, disconnect the power source from the incoming electrical power.
3. Maintain cables, grounding wire, connections, power cord, and power supply in safe working order. Do not operate any equipment in faulty condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
5. Keep all safety devices and cabinet covers in position and in good repair.
6. Use equipment only for its intended purpose. Do not modify it in any manner.

ADDITIONAL SAFETY INFORMATION -- For more information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.

The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, are recommended to you:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"
5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding"
6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding""
7. AWS SP - "Safe Practices" - Reprint, Welding Handbook.
8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."

MEANING OF SYMBOLS - As used throughout this manual: Means Attention! Be Alert! Your safety is involved.

DANGER **Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.**

WARNING **Means potential hazards which could result in personal injury or loss of life.**

CAUTION **Means hazards which could result in minor personal injury.**

PRECAUCION DE SEGURIDAD

ADVERTENCIA: Estas Precauciones de Seguridad son para su protección. Ellas hacen resumen de información proveniente de las referencias listadas en la sección "Información Adicional Sobre La Seguridad". Antes de hacer cualquier instalación o procedimiento de operación , asegúrese de leer y seguir las precauciones de seguridad listadas a continuación así como también todo manual, hoja de datos de seguridad del material, calcomanias, etc. El no observar las Precauciones de Seguridad puede resultar en daño a la persona o muerte.

PROTEJASE USTED Y A LOS DEMAS-- Algunos procesos de soldadura, corte y ranurado son ruidosos y requiren protección para los oídos. El arco, como el sol , emite rayos ultravioleta (UV) y otras radiaciones que pueden dañar la piel y los ojos. El metal caliente causa quemaduras. EL entrenamiento en el uso propio de los equipos y sus procesos es esencial para prevenir accidentes. Por lo tanto:

1. Utilice gafas de seguridad con protección a los lados siempre que esté en el área de trabajo, aún cuando esté usando careta de soldar, protector para su cara u otro tipo de protección.
2. Use una careta que tenga el filtro correcto y lente para proteger sus ojos, cara, cuello, y oídos de las chispas y rayos del arco cuando se esté operando y observando las operaciones. Alerte a todas las personas cercanas de no mirar el arco y no exponerse a los rayos del arco eléctrico o el metal fundido.
3. Use guantes de cuero a prueba de fuego, camisa pesada de mangas largas, pantalón de ruedo liso, zapato alto al tobillo, y careta de soldar con capucha para el pelo, para proteger el cuerpo de los rayos y chispas calientes provenientes del metal fundido. En ocaciones un delantal a prueba de fuego es necesario para protegerse del calor radiado y las chispas.
4. Chispas y partículas de metal caliente puede alojarse en las mangas enrolladas de la camisa , el ruedo del pantalón o los bolsillos. Mangas y cuellos deberán mantenerse abotonados, bolsillos al frente de la camisa deberán ser cerrados o eliminados.
5. Proteja a otras personas de los rayos del arco y chispas calientes con una cortina adecuada no-flamable como división.
6. Use careta protectora además de sus gafas de seguridad cuando esté removiendo escoria o puliendo. La escoria puede estar caliente y desprenderse con velocidad. Personas cercanas deberán usar gafas de seguridad y careta protectora.

FUEGO Y EXPLOSIONES -- El calor de las flamas y el arco pueden ocacionar fuegos. Escoria caliente y las chispas pueden causar fuegos y explosiones. Por lo tanto:

1. Remueva todo material combustible lejos del área de trabajo o cubra los materiales con una cobija a prueba de fuego. Materiales combustibles incluyen madera, ropa, líquidos y gases flamables, solventes, pinturas, papel, etc.
2. Chispas y partículas de metal pueden introducirse en las grietas y agujeros de pisos y paredes causando fuegos escondidos en otros niveles o espacios. Asegúrese de que toda grieta y agujero esté cubierto para proteger lugares adyacentes contra fuegos.
3. No corte, suelde o haga cualquier otro trabajo relacionado hasta que la pieza de trabajo esté totalmente limpia y libre de substancias que puedan producir gases inflamables o vapores tóxicos. No trabaje dentro o fuera de contenedores o tanques cerrados. Estos pueden explotar si contienen vapores inflamables.
4. Tenga siempre a la mano equipo extintor de fuego para uso instantáneo, como por ejemplo una manguera con agua, cubeta con agua, cubeta con arena, o extintor portátil. Asegúrese que usted esta entrenado para su uso.
5. No use el equipo fuera de su rango de operación. Por ejemplo, el calor causado por cable sobrecarga en los cables de soldar pueden ocasionar un fuego.
6. Después de termirar la operación del equipo, inspeccione el área de trabajo para cerciorarse de que las chispas o metal caliente ocasionen un fuego más tarde. Tenga personal asignado para vigilar si es necesario.
7. Para información adicional , haga referencia a la publicación NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", disponible a través de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

CHOQUE ELECTRICO -- El contacto con las partes eléctricas energizadas y tierra puede causar daño severo o muerte. NO use soldadura de corriente alterna (AC) en áreas húmedas, de movimiento confinado en lugares estrechos o si hay posibilidad de caer al suelo.

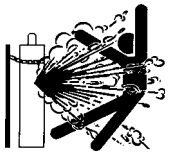
1. Asegúrese de que el chasis de la fuente de poder esté conectado a tierra através del sistema de electricidad primario.
2. Conecte la pieza de trabajo a un buen sistema de tierra física.
3. Conecte el cable de retorno a la pieza de trabajo. Cables y conductores expuestos o con malas conexiones pueden exponer al operador u otras personas a un choque eléctrico fatal.
4. Use el equipo solamente si está en buenas condiciones. Reemplaze cables rotos, dañados o con conductores expuestos.
5. Mantenga todo seco, incluyendo su ropa, el área de trabajo, los cables, antorchas, pinza del electrodo, y la fuente de poder.
6. Asegúrese que todas las partes de su cuerpo están insuladas de ambos, la pieza de trabajo y tierra.
7. No se pare directamente sobre metal o tierra mientras trabaja en lugares estrechos o áreas húmedas; trabaje sobre un pedazo de madera seco o una plataforma insulada y use zapatos con suela de goma.
8. Use guantes secos y sin agujeros antes de energizar el equipo.
9. Apage el equipo antes de quitarse sus guantes.
10. Use como referencia la publicación ANSI/ASC Standard Z49.1 (listado en la próxima página) para recomendaciones específicas de como conectar el equipo a tierra. No confunda el cable de soldar a la pieza de trabajo con el cable a tierra.

CAMPOS ELECTRICOS Y MAGNETICOS - Son peligrosos. La corriente eléctrica fluye através de cualquier conductor causando a nivel local Campos Eléctricos y Magnéticos (EMF). Las corrientes en el área de corte y soldadura, crean EMF alrrededor de los cables de soldar y las maquinas. Por lo tanto:

1. Soldadores u Operadores que use marca-pasos para el corazón deberán consultar a su médico antes de soldar. El Campo Electromagnético (EMF) puede interferir con algunos marca-pasos.
2. Exponerse a campos electromagnéticos (EMF) puede causar otros efectos de salud aún desconocidos.
3. Los soldadores deberán usar los siguientes procedimientos para minimizar exponerse al EMF:
   A. Mantenga el electrodo y el cable a la pieza de trabajo juntos, hasta llegar a la pieza que usted quiere soldar. Asegúrelos uno junto al otro con cinta adhesiva cuando sea posible.
   B. Nunca envuelva los cables de soldar alrededor de su cuerpo.
   C. Nunca ubique su cuerpo entre la antorcha y el cable, a la pieza de trabajo. Mantega los cables a un sólo lado de su cuerpo.
   D. Conecte el cable de trabajo a la pieza de trabajo lo más cercano posible al área de la soldadura.
   E. Mantenga la fuente de poder y los cables de soldar lo más lejos posible de su cuerpo.

HUMO Y GASES -- El humo y los gases, pueden causar malestar o daño, particularmente en espacios sin ventilación. No inhale el humo o gases. El gas de protección puede causar falta de oxígeno. Por lo tanto:

1. Siempre provea ventilación adecuada en el área de trabajo por medio natural o mecánico. No solde, corte, o ranure materiales con hierro galvanizado, acero inoxidable, cobre, zinc, plomo, berílio, o cadmio a menos que provea ventilación mecánica positiva . No respire los gases producidos por estos materiales.
2. No opere cerca de lugares donde se aplique substancias químicas en aerosol. El calor de los rayos del arco pueden reaccionar con los vapores de hidrocarburo clorinado para formar un fosfógeno, o gas tóxico, y otros irritant es.
3. Si momentáneamente desarrolla inrritación de ojos, nariz o garganta mientras est á operando, es indicación de que la ventilación no es apropiada. Pare de trabajar y tome las medidas necesarias para mejorar la ventilación en el área de trabajo. No continúe operando si el malestar físico persiste.
4. Haga referencia a la publicación ANSI/ASC Standard Z49.1 (Vea la lista a continuación) para recomendaciones específicas en la ventilación.
5. **ADVERTENCIA-- Este producto cuando se utiliza para soldaduras o cortes, produce humos o gases, los cuales contienen químicos conocidos por el Estado de California de causar defectos en el nacimiento, o en algunos casos, Cancer. (California Health & Safety Code §25249.5 et seq.)**



MANEJO DE CILINDROS-- Los cilindros, si no son manejados correctamente, pueden romperse y liberar violentamente gases. Rotura repentina del cilindro, válvula, o válvula de escape puede causar daño o muerte. Por lo tanto:

1. Utilize el gas apropiado para el proceso y utilize un regulador diseñado para operar y reducir la presión del cilindro de gas . No utilice adaptadores. Mantenga las mangueras y las conexiones en buenas condiciones. Observe las instrucciones de operación del manufacturero para montar el regulador en el cilindro de gas comprimido.
2. Asegure siempre los cilindros en posición vertical y amárrelos con una correa o cadena adecuada para asegurar el cilindro al carro, transportes, tablilleros, paredes, postes, o armazón. Nunca asegure los cilindros a la mesa de trabajo o las piezas que son parte del circuito de soldadura . Este puede ser parte del circuito elélectrico.
3. Cuando el cilindro no está en uso, mantenga la válvula del cilindro cerrada. Ponga el capote de protección sobre la válvula si el regulador no está conectado. Asegure y mueva los cilindros utilizando un carro o transporte adecuado. Evite el manejo brusco de los cilindros.
4. Localize los cilindros lejos del calor, chispas, y flamas. Nunca establezca un arco en el cilindro.
5. Para información adicional, haga referencia a la publicación CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", disponible através del Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

MANTENIMIENTO DEL EQUIPO -- Equipo defectuoso o mal mantenido puede causar daño o muerte. Por lo tanto:

1. Siempre tenga personal cualificado para efectuar l a instalación, diagnóstico, y mantenimiento del equipo. No ejecute ningún trabajo eléctrico a menos que usted esté cualificado para hacer el trabajo.
2. Antes de dar mantenimiento en el interior de la fuente de poder, desconecte la fuente de poder del suministro de electricidad primaria.
3. Mantenga los cables, cable a tierra, conexciones, cable primario, y cualquier otra fuente de poder en buen estado operacional. No opere ningún equipo en malas condiciones.
4. No abuse del equipo y sus accesorios. Mantenga el equipo lejos de cosas que generen calor como hornos, también lugares húmedos como charcos de agua , aceite o grasa, atmósferas corrosivas y las inclemencias del tiempo.
5. Mantenga todos los artículos de seguridad y coverturas del equipo en su posición y en buenas condiciones.
6. Use el equipo sólo para el propósito que fue diseñado. No modifique el equipo en ninguna manera.

INFORMACION ADICIONAL DE SEGURIDAD -- Para más información sobre las prácticas de seguridad de los equipos de arco eléctrico para soldar y cortar, pregunte a su suplidor por una copia de "Precautions and Safe Practices for Arc Welding, Cutting and Gouging-Form 52-529.

Las siguientes publicaciones, disponibles através de la American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, son recomendadas para usted:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"
5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding"
6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding""
7. AWS SP - "Safe Practices" - Reprint, Welding Handbook.
8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."

SIGNIFICADO DE LOS SIMBOLOS -- Según usted avanza en la lectura de este folleto: Los Símbolos Significan ¡Atención! ¡Esté Alerta! Se trata de su seguridad.

PELIGRO **Significa riesgo inmediato que, de no ser evadido, puede resultar inmediatamente en serio daño personal o la muerte.**

ADVERTENCIA **Significa el riesgo de un peligro potencial que puede resultar en serio daño personal o la muerte.**

CUIDADO **Significa el posible riesgo que puede resultar en menores daños a la persona.**

PRÉCAUTIONS DE SÉCURITÉ

AVERTISSEMENT: Ces règles de sécurité ont pour objet d' assurer votre protection. Veillez à lire et à observer les précautions énoncées ci-dessous avant de monter l' équipement ou de commercer à l'utiliser. Tout défaut d'observation de ces précautions risque d'entraîner des blessures graves ou mortelles.

1. PROTECTION INDIVIDUELLE-- Les brûlures de la peau et des yeux dues au rayonnement de l'arc électrique ou du métal incandescent, lors du soudage au plasma ou à l'électrode ou lors du gougeage à l'arc, peuvent s'avérer plus graves que celles résultant d'une exposition prolongée au soleil. Aussi convient-il d'observer les précautions suivantes:

a. Portez un écran facial adéquat muni des plaques protectrices et des verres filtrants appropriés afin de vous protéger les yeux, le visage, le cou et les oreilles des étincelles et du rayonnement de l'arc électrique lorsque vous effectuez des soudures ou des coupes ou lorsque vous en observez l'exécution.
AVERTISSEZ les personnes se trouvant à proximité de façon à ce qu'elles ne regardent pas l'arc et à ce qu'elles ne s'exposent pas à son rayonnement, ni à celui du métal incandescent.

b. Portez des gants ignifugés à crispins, une tunique épaisse à manches longues, des pantalons sans rebord, des chaussures à embout d'acier et un casque de soudage ou une calotte de protection, afin d'éviter d'exposer la peau au rayonnement de l'arc électrique ou du métal incandescent. Il est également souhaitable d'utiliser un tablier ininflammable de façon à se protéger des étincelles et du rayonnement thermique.

c. Les étincelles ou les projections de métal incandescent risquent de se loger dans des manches retroussées, des bords relevés de pantalons ou dans des poches. Aussi convient-il de garder boutonnés le col et les manches et de porter des vêtements sans poches à l'avant.

d. Protégez des étincelles et du rayonnement de l'arc électrique les autres personnes travaillant à proximité à l'aide d'un écran ininflammable adéquat.

e. Ne jamais omettre de porter des lunettes de sécurité lorsque vous vous trouvez dans un secteur où l'on effectue des opérations de soudage ou de coupage à l'arc. Utilisez des lunettes de sécurité à écrans ou verres latéraux pour piquer ou meûler le laitier. Les piquetures incandescentes de laitier peuvent être projetées à des distances considérables. Les personnes se trouvant à proximité doivent également porter des lunettes de protection.

f. Le gougeage à l'arc et le soudage à l'arc au plasma produisent un niveau de bruit extrêmement élevé (de 100 à 114 dB) et exigent par conséquent l'emploi de dispositifs appropriés de protection auditive.

2. PRÉVENTION DES INCENDES-- Les projections de laitier incandescent ou d'étincelles peuvent provoquer de graves incendies au contact de matériaux combustibles solides, liquides ou gazeux. Aussi faut-il observer les précautions suivantes:

a. Éloigner suffisamment tous les matériaux combustibles du secteur où l'on exécute des soudures ou des coupes à l'arc, à moins de les recouvrir complètement d'une bâche non-inflammable. Ce type de matériaux comprend notamment le bois, les vêtements, la sciure, l'essence, le kérosène, les peintures, les solvants, le gaz naturel, l'acétylène, le propane et autres substances combustibles semblables.

b. Les étincelles ou les projections de métal incandescent peuvent tomber dans des fissures du plancher ou dans des ouvertures des murs et y déclencher une ignition lente cachée. Veiller à protéger ces ouvertures des étincelles et des projections de métal.

c. N'exécutez pas de soudures, de coupes, d'opérations de gougeage ou autres travaux à chaud à la surface de barils, bidons, réservoirs ou autres contenants usagés, avant de les avoir nettoyés de toute trace de substance susceptible de produire des vapeurs inflammables ou toxiques.

d. En vue d'assurer la prévention des incendies, il convient de disposer d'un matériel d'extinction prêt à servir immédiatement, tel qu'un tuyau d'arrosage, un seau à eau, un seau de sable ou un extincteur portatif.

e. Une fois le travail à l'arc terminé, inspectez le secteur de façon à vous assurer qu'aucune étincelle ou projection de métal incandescent ne risque de provoquer ultérieurement un feu.

3. CHOC ÉLECTRIQUE-- Le gougeage à l'arc et à l'arc au plasma exige l'emploi de tensions à vide relativement importantes; or, celles-ci risquent de causer des dommages corporels graves et même mortels en cas d'utilisation inadéquate. La gravité du choc électrique reçu dépend du chemin suivi par le courant à travers le corps humain et de son intensité.

a. Ne laissez jamais de surfaces métalliques sous tension venir au contact direct de la peau ou de vêtements humides. Veillez à porter des gants bien secs.

b. Si vous devez effectuer un travail sur une surface métallique ou dans un secteur humide, veillez à assurer votre isolation corporelle en portant des gants secs et des chaussures à semelles de caoutchouc et en vous tenant sur une planche ou une plate-forme sèche.

c. Mettez toujours à la terre le poste de soudage/coupage en le reliant par un câble à une bonne prise de terre.

d. N'utilisez jamais de câbles usés ou endommagés. Ne surchargez jamais le câble. Utilisez toujours un équipement correctement entretenu.

e. Mettez l'équipement hors tension lorsqu'il n'est pas en service. une mise à la masse accidentelle peut en effet provoquer une surchauffe de l'équipement et un danger d'incendie. Ne pas enrouler ou passer le câble autour d'une partie quelconque du corps.

f. Vérifiez si le câble de masse est bien relié à la pièce en un point aussi proche que possible de la zone de travail. Le branchement des câbles de masse à l'ossature du bâtiment ou en un point éloigné de la zone de travail augmente en effet le risque de passage d'un courant de sortie par des chaînes de

PRÉCAUTIONS DE SÉCURITÉ

l evage, des câbles de grue ou divers chemins électriques.

g. Empêchez l'apparition de toute humidité, notamment sur vos vêtements, à la surface de l'emplacement de travail, des câbles, du porte-électrode et du poste de soudage/coupage. Réparez immédiatement toute fuite d'eau.

4. VENTILATION-- La respiration prolongée des fumées résultant des opérations de soudage/coupage, à l'intérieur, d'un local clos, peut provoquer des mal-aises et des dommages corporels. Aussi convient-il d'observer les précautions suivantes:

a. Assurez en permanence une aération adéquate de l'emplacement de travail en maintenant une ventilation naturelle ou à l'aide de moyens mécaniques. N'effectuez jamais de travaux de soudage ou de coupage sur des matériaux de zinc, de plomb, de beryllium ou de cadmium en l'absence de moyens mécaniques de ventilation capables d'empêcher l'inhalation des fumées dégagées par ces matériaux.

b. N'effectuez jamais de travaux de soudage ou de coupage à proximité de vapeurs d'hydrocarbure chloré résultant d'opérations voisines de dégraissage ou de pulvérisation. La chaleur dégagée ou le rayonnement de l'arc peut déclencher la formation de phosgène -- gaz particulièrement toxique -- et d'autres gaz irritants, à partir des vapeurs de solvant.

c. Une irritation momentanée des yeux, du nez ou de la gorge constatée au cours de l'utilisation de l'équipement dénote un défaut de ventilation. Arrêtez-vous de travailler afin de prendre les mesures néces-saires à l'amélioration de la ventilation. Ne poursuivez pas l'opération entreprise si le malaise persiste.

d. Certaines commandes comportent des canalisations où circule de l'hydrogène. L'armoire de commande est munie d'un ventilateur destiné à empêcher la forma-tion de poches d'hydrogène, lesquelles présentent un danger d'explosion; ce ventilateur ne fonctionne que si l'interrupteur correspondant du panneau avant se trouve placé en position ON (Marche). Veillez à manœuvrer cette commande en vérifiant si le couvercle est bien en place, de façon à assurer l'efficacité de la ventilation ainsi réalisée. Ne jamais débrancher le ventilateur.

e. Les fumées produites par l'opération de soudage ou de coupage peuvent s'avérer toxiques. Aussi est-il nécessaire de disposer en permanence d'un dispositif adéquat de ventilation de type aspirant, afin d'élimi-ner du voisinage de l'opérateur tout dégagement de fumée visible.

f. Consultez les recommandations particulières en matière de ventilation indiquées à l'alinéa 6 de la norme Z49.1 de l'AWS.

5. ENTRETIEN DE L'ÉQUIPEMENT-- Un équipement entretenu de façon défectueuse ou inadéquate risque non seulement de réaliser un travail de mauvaise qualité mais, chose plus grave encore, d'entraîner des dommages corporels graves, voire mortels en déclenchant des incendies ou des chocs électriques. Observez par conséquent les précautions suivantes:

a. Efforcez-vous de toujours confier à un personnel qua-lifié l'installation, le dépannage et l'entretien du poste de soudage et de coupage. N'effectuez aucune réparation électrique sur l'équipement à moins d'être qua-lifié à cet effet.

b. Ne procédez jamais à une tâche d'entretien quelconque à l'intérieur du poste de soudage/ coupage, avant d'avoir débranché l'alimentation électrique.

c. Maintenez en bon état de fonctionnement les câbles, le câble de masse, les branchements, le cordon d'alimentation et le poste de soudage/coupage. N'utilisez jamais le poste ou l'équipement s'il présente une défectuosité quelconque.

d. Prenez soin du poste de soudage et de coupage et des équipements accessoires. Gardez-les à l'écart des sources de charleur, notamment des fours, de l'humidité, des flaques d'eau maintenez-les à l'abri des traces d'huile ou de graisse, des atmosphères corrosives et des intempéries.

e. Laissez en place tous les dispositifs de sécurité et tous les panneaux de l'armoire de commande en veillant à les garder en bon état.

f. Utilisez le poste de soudage/coupage conformément à son usage prévu et n'effectuez aucune modification.

6. INFORMATIONS COMPLÉMENTAIRES RELATIVES À LA SÉCURITÉ--

Pour obtenir des informations complémentaires sur les règles de sécurité à observer pour le montage et l'utilisation d'équipements de soudage et de coupage électriques et sur les méthodes de travail recommandées, demandez un exemplaire du livret N° 52529 "Precautions and Safe Practices for Arc Welding, Cutting and Gouging" publié par ESAB. Nous conseillons également de consulter les publications sui-vantes, tenues à votre disposition par l'American Welding Society, 550 N.W. LeJuene Road, Miami, FL 32126:

a. "Safety in Welding and Cutting" AWS Z49.1

b. "Recommended Safe Practices for Gas-Shielded Arc Welding "AWS A6. 1.

c. "Safe Practices for Welding and Cutting Containers That Have Held Combustibles" AWS-A6.0.

d. "Recommended Safe Practices for Plasma Arc Cut-ting" AWS-A6. 3.

e. "Recommended Safe Practices for Plasma Arc Weld-ing" AWS-C5. 1.

f. "Recommended Safe Practices for Air Carbon Arc Gouging and Cutting" AWS-C5. 3.

g. "Code For Safety in Welding and Cutting" CSA-Standard W117. 2.

I. SAFETY

Before the MultiPower 460 Pulse Control Panel Kit is installed, the safety section at the front of this manual should be read completely. This will help avoid possible injury due to misuse or improper installation.

The definitions relating to the:

DANGER
WARNING
CAUTION

safety notations are described at the end of the Safety Section in the front of this manual — **read them and their specific text references carefully.**

II. DESCRIPTION

This manual has been prepared for use by an experienced operator. It provides information to familiarize the operator with the design, installation and operation of the MultiPower 460 Pulse Panel. DO NOT attempt to install or operate this pulse option until you have read and fully understood these instructions. The information presented here should be given careful consideration to ensure proper installation and optimum weld performance.

The MultiPower 460 Pulse kit upgrades a standard MultiPower 460 power source to a multi-process power source designed for Mig short circuiting, spray and pulse spray transfer (GMAW), flux core (FCAW), Tig (GTAW), and stick (SMAW) welding and air carbon arc cutting/gouging (CAC-A) applications. The following instruction assumes you are familiar with the standard MultiPower 460 operation and set-up. These instruction are intended to supplement the original MultiPower 460 instruction book received when the power source was installed.

Figure -1 MultiPower 460Pulse Control Panel

A. PULSE CONTROL PANEL DESCRIPTION

(Refer to Figure 2-1)

1. FAULT LAMP

The RED fault light on the MultiPower 460 Pulse front panel indicates a problem with set-up parameters. A "Steady" light "On" indicates there is no program for the material and wire diameter selected. A "Blinking" light indicates the wire feed speed is out of the recommended range..

2. TEMPERATURE LAMP

The TEMP lamp illuminates if an over temperature condition occurs within the MultiPower 460 Pulse power source. This condition may be caused by excessive duty cycle or over-current conditions. When an over temperature condition occurs, the welding output is turned off and the unit must be allowed to cool. The machine will automatically reset when the temperature falls to a safe level.

3. PROCESS SELECTOR SWITCH

The three position process selector switch is located in the upper right-hand corner of the control panel. The process selector switch position provides the visual indication of which weld process (Mig, Tig or stick) has been selected.

⚠ WARNING

ELECTRIC SHOCK CAN KILL! Make sure that all primary input power to the power source and wire feeder has been disconnected at the wall (line) disconnect switch or circuit breaker before making the following connections.

4. DIGITAL DISPLAYS (WFS, AMPS & VOLTS)

The digital displays located on the left side of the control panel are multifunctional depending on the welding process being used. The top display reads wire feed speed in inches per minute in the MIG PRESET mode and welding current (in amps) in the TIG and STICK PRESET mode. During welding both displays indicate average welding current (amps) and average welding voltage.

The wire feed speed is displayed in inches per minute (IPM) in the top display when the PRESET button is pressed and the wire speed adjustment knob on the wire feeder is turned. The WFS LED beside the top display will light when the display is showing wire feed speed.

5. VOLTAGE/CURRENT/TRIM ADJUST KNOB

The arc voltage is controlled with this knob when the WELD PROCESS selector switch is in the MIG position. The Mig arc voltage can be preset by pressing the PRESET button and reading the arc volts in the bottom digital display while turning this knob.

The arc current is controlled with this knob when the WELD PROCESS SWITCH is in the TIG or STICK position. The welding current can be preset in amperes by pressing the PRESET button and reading the current (amps) in the top digital display while turning this knob. The average arc current will be displayed during welding.

For MIG PULSE welding, the arc length (arc voltage) is controlled with this knob. The WELD PROCESS switch is placed in the MIG position and the MIG PROCESS switch is placed in the MIG PULSE position. The knob should be place at the 12 o'clock position as the synergic preset for the wire feed speed, WIRE TYPE and WIRE DIAMETER chosen by the operator using the PULSE SELECTION switches. The arc length can then be adjusted by turning the knob clockwise to increase the arc length or counterclockwise to decrease the arc.

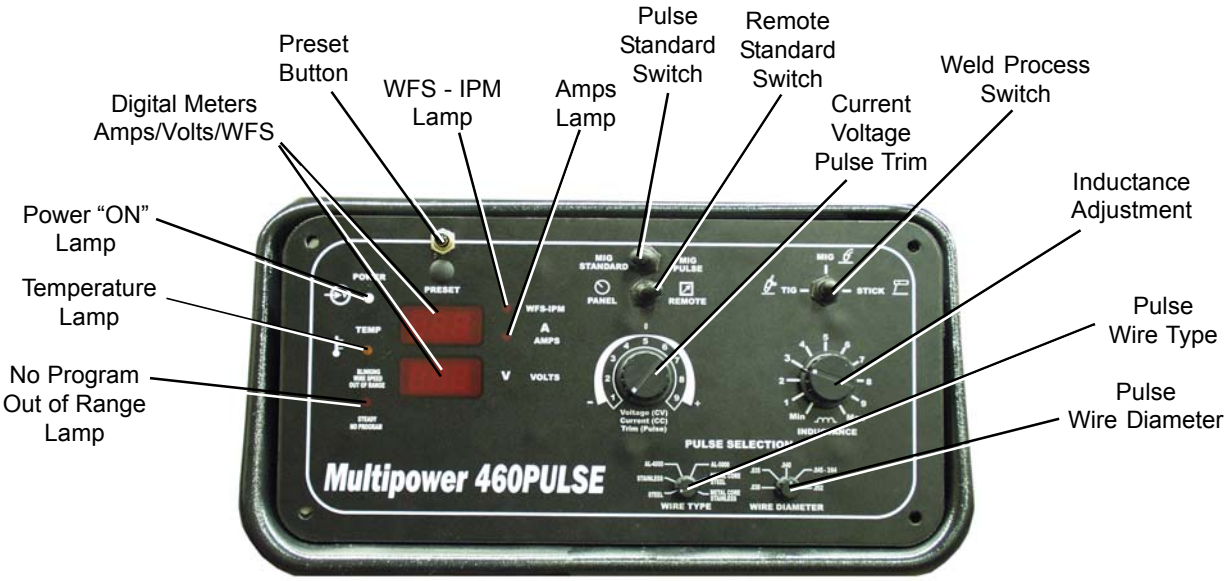


Figure 3-1- Pulse Mig Control Panel

6. PANEL/REMOTE SWITCH

With this switch in the PANEL position, output voltage in the CV mode and the output current in the CC mode are controlled by adjusting the VOLTAGE/ CURRENT/TRIM knob on the power source control panel to the desired output. In the REMOTE position, output is controlled using a remote control device such as a wire feeder, hand control or foot control depending on the weld process being used.

7. INDUCTANCE TRIM

This control is used only in the STANDARD MIG process mode and is deactivated in the TIG, STICK and MIG PULSE mode.

Inductance is used to optimize short circuiting arc performance by changing the current rise and fall time of each short circuit. This results in improved spatter control, weld bead wetting and arc stability. The short circuiting Mig arc performance will change from a high short circuit frequency, fast reacting arc, to a lower short circuit frequency, soft and less spattering arc as the dial is turned clockwise. The optimized arc performances will vary depending on shielding gas, wire type and wire diameter. The operator can adjust this control to optimize welding characteristics.

8. MIG STANDARD/PULSE SWITCH

This switch enables the Mig pulse operation mode. When this switch is in the MIG PULSE position, the pulse parameters are determined by the WIRE TYPE and WIRE DIAMETER position on the PULSE SELECTION switches.

9. PULSE SELECTION SWITCHES

WIRE TYPE

Use this switch to select the WIRE TYPE installed on the wire feeder. The position of this switch and the WIRE DIAMETER switch selects the pulse parameters to be used during welding in the Mig pulse mode.

WIRE DIAMETER

Use this switch to select the WIRE DIAMETER installed on the wire feeder. The position of this switch and the WIRE TYPE switch selects the pulse parameters to be used during welding in the Mig pulse mode.

IV. PULSE CONTROL PANEL INSTALLATION

The standard MultiPower 460 control panel are easily removed and replaced with the MultiPower 460 Pulse version using the following procedure. Refer to Figure 4-1.

Step 1. Disconnect ALL primary power from the MultiPower 460 by unplugging the unit or removing the line fuses.

Step 2. Remove the four screws (one at each corner) holding the standard MultiPower 460 control panel in place.

Step 3. Tilt the panel forward and disconnect the wiring harness plug connector and remove the control panel from the PC board compartment. Do not discard this panel is can be used as a spare replacement panel if problems arise.

Step 4 Connect the NEW MultiPower 460 Pulse control panel harness plug to the power source harness.

Step 5. Carefully position the control panel over the PC board compartment and secure with the mounting screws removed from the standard control panel.

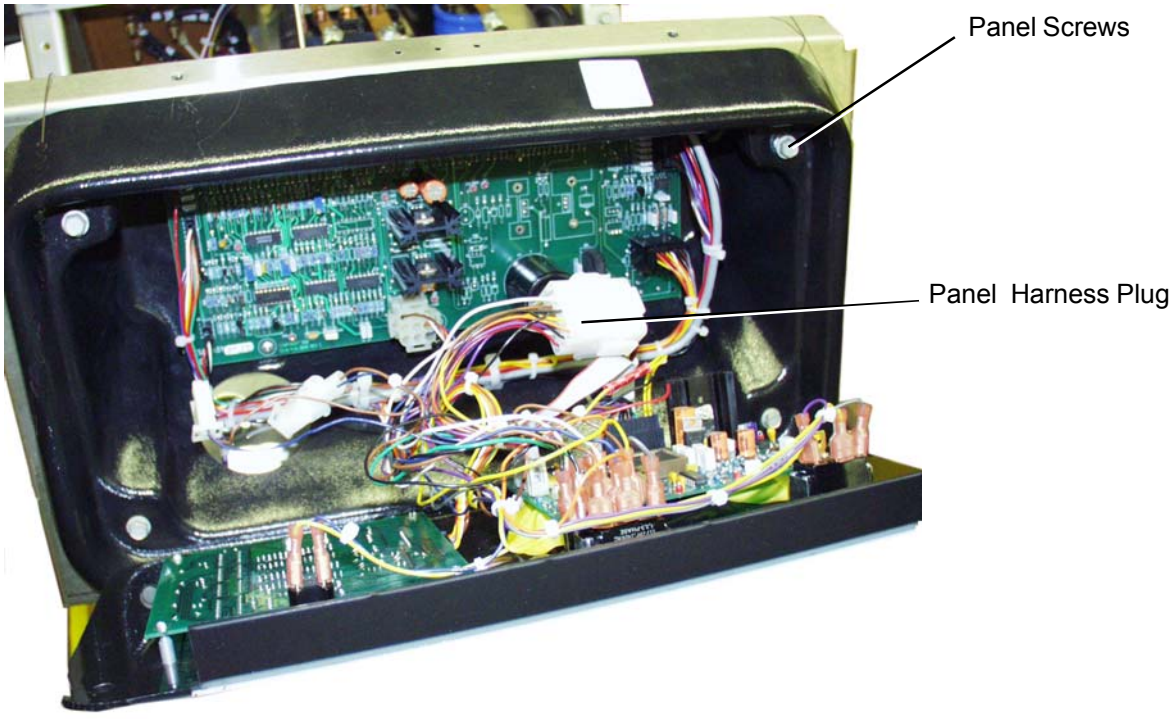


Figure 4-1 MultiPower 460 Pulse Harness Connection

V. OPERATION

A. WIRE FEEDER COMPATIBILITY

The MultiPower 460 Pulse power source can be used with several ESAB 42 volt wire feeders. The model wire feeder being used will determine the setup method and operator interface. The position of the REMOTE/PANEL switch determines the location of the voltage preset and TRIM locations. The wire feed speed is always set from the wire feeder using the wire speed knob on the feeder control panel. To see the preset wire feed speed, press the PRESET button on the MultiPower 460 control panel. Use Table 5-1 to determine the switch position of operator preference. In most Mig welding applications, the switch will be in the REMOTE position and the wire feed speed and voltage will be adjusted from the wire feed front panel.

B. DIGITAL DISPLAY METERS

The digital displays located on the left side of the control panel are multifunctional depending on the welding process being used. The MultiPower 460 Pulse digital display meters permit preset or the wire feed speed on wire feeders without digital displays. A Mig 2E, 4HD or DuraDrive 4-30 or 4-48 will not need digital meters to preset the wire feed speed. The wire feed speed can be displayed on the MultiPower 460 panel meter.

C. MIG WELDING

In the MIG process mode, the digital displays will read preset wire feed speed in inches per minute and preset arc volts when the PRESET button is pressed. Once welding begins, the displays will show average welding current and volts in the top and bottom display, respectively. The displays have a “HOLD” circuit that retains the welding conditions. After welding stops, the display will continue to show the last welding current and voltage sampled for 10 seconds, then returns to “0”.

Table 5-1 Wire Feeder Compatibility

		MIG MODE SWITCH*			
		MIG STANDARD (MultiPower 460)		MIG PULSE (MultiPower 460 Pulse)	
Wire Feeder	**Arc Trim Location from:**	**PANEL**	**REMOTE**	**Synergic**	**Non-Synergic****
Mig 4HD DuraDrive 4-30 DuraDrive 4-48					
	Feeder		X	X	Optional
	Remote Pendant		X	X	Optional
	MP-460 Panel	X		X	Optional
Mig 2E Mig 5XL (Mongoose)	Feeder	X	N/A		
	Remote Pendant		X	X	Optional
	MP-460 Panel	X		X	Optional
MobileMaster IV (Off the Arc) Mini 8 (Off the Arc)	Feeder	X	N/A	N/A	X
	Remote Pendant		X	N/A	X
	MP-460 Panel	X		N/A	X

N/A - Not Available

* - Process switch MUST be in the MIG position.

** - See Synergic/NonSynergic description section for configuration information

Figure4-1 Standard Mig Setup Procedure

D. STANDARD MIG (CV) WELDING

When the PROCESS switch is placed in the MIG position the MultiPower 460 Pulse is set for CV (constant voltage) welding. The power source will output open circuit voltage (OCV) when the Mig Gun trigger is depressed. The following procedure assumes the wire feed and voltage adjustments will be made from the wire feeder front panel and wire and gas have been installed.

NOTE

Place MIG STANDARD/MIG PULSE switch in the MIG STANDARD position when using the Tig, Stick or Arc Gouging process modes.

Step 1. Connect wire feeder to MultiPower 460 Pulse and set PANEL/REMOTE switch to REMOTE position.

Step 2. Set the MIG STANDARD/PULSE switch to the MIG STANDARD position.

Step 3. Place the WELD PROCESS switch in the MIG (center) position.

Step 4. Press and release the PRESET button then turn the wire speed control on the wire feeder to the desired speed shown on the top digital display window of the MultiPower 460 Pulse.

Step 5. Turn the VOLTAGE knob of the wire feeder to the desired arc voltage in the bottom digital display window of the MultiPower 460 Pulse.

Step 6. Set the shielding gas flow rate to 35 cfh by activating the gas purge switch on the wire feeder or pulling the gun trigger and turning the adjustment knob on the Flowmeter.

Step 7. Connect the work cable to the part top be welded and pull the gun trigger to start welding. Trim the wire speed and volts as needed for the desired arc characteristics and weld quality.

E. MIG PULSE WELDING

The MultiPower 460 Pulse is designed to provide simple to use, high quality, preprogrammed synergic and non-synergic pulsed Mig welding. Synergic pulsed Mig welding means that pulse parameters (such as pulse height, pulse width, background current and pulse frequency) are automatically adjusted by the MultiPower 460 Pulse as the wire feed speed is changed by the operator.

A unique non-synergic Mig pulse mode is also offered for welding applications and wire feeder combinations that cannot use the preprogrammed synergic pulse data.

The preprogrammed WIRE TYPES, WIRE DIAMETERS and shielding gases are listed in Table 5-2

The TRIM allows the operator to fine tune the pulse arc length and optimize the welding. When the PROCESS switch is placed in the MIG position and the MIG STANDARD/PULSE switch is place in the MIG PULSE position, the MultiPower 460 Pulse is set for CC over CC (constant current) pulse welding. The power source will output open circuit voltage (OCV) when the Mig Gun trigger is depressed. The MultiPower 460 Pulse provides a TRIM from either the wire feeder or power source depending on the position of the PANEL/REMOTE

Table 5-2 Wire Types, Diameter and Shield Gases

Material Type	Shield Gases	Shielding Gas (AWS Designation)
Carbon Steel	035, 040, 045, 052, 062	Ar - 5% CO2 (SG-AC-5) Ar - 8% CO2 (SG-AC-8) Ar - 10% CO2 (SG-AC-10) Ar - 2% O2 (SG-AO-2) Ar - 8% CO2 - 2% O2 (SG-ACO-8/2)
Stainless Steel	035, 040, 045, 062	Ar -2% CO2 (SG-AC-2) Ar - 8% CO2 (SG-AC-8) Ar - 2% O2 (SG-AO-2) Ar - 8% CO2 - 2% O2 (SG-ACO-8/2) Ar - He
4000 & 5000 Aluminum	035, 040, 3/64, 062	Ar (SG-A) Ar - He 25% (SG-AHe-25) Ar - He 50% (SG-Ahe-50)
Metal Core Carbon Steel	035, 040, 045, 052, 062	Ar - 5% CO2 (SG-AC-5) Ar - 8% CO2 (SG-AC-8) Ar - 10% CO2 (SG-AC-10) Ar - 2% O2 (SG-AO-2) Ar - 8% CO2 - 2% O2 (SG-ACO-8/2)
Metal Core Stainless Steel	045, 062	Ar - 2% CO2 (SG-AC-2) Ar - 8% CO2 (SG-AC-8) Ar - 1% O2 (SG-AO-1) Ar - He 50% - 2% CO2 (SG-AHeC-50/2)

switch characteristics. The TRIM adjustment is calibrated such that the preprogrammed synergic pulse data is approximately at 12 o'clock of the TRIM knob position. The operator should preset the voltage control on the wire feeder to the 12 o'clock position and adjust for best arc characteristics.

The operator can change to STANDARD MIG (CV) by simply moving the MIG STANDARD/PULSE switch to the STANDARD position.

The following procedure assumes the wire feed and voltage adjustments will be made from the wire feeder front panel and wire and gas have been installed. See Table 4-2 for the recommended shielding gases for each wire alloy type. Set the flowrate at 30 to 40 cfh for argon mixtures.

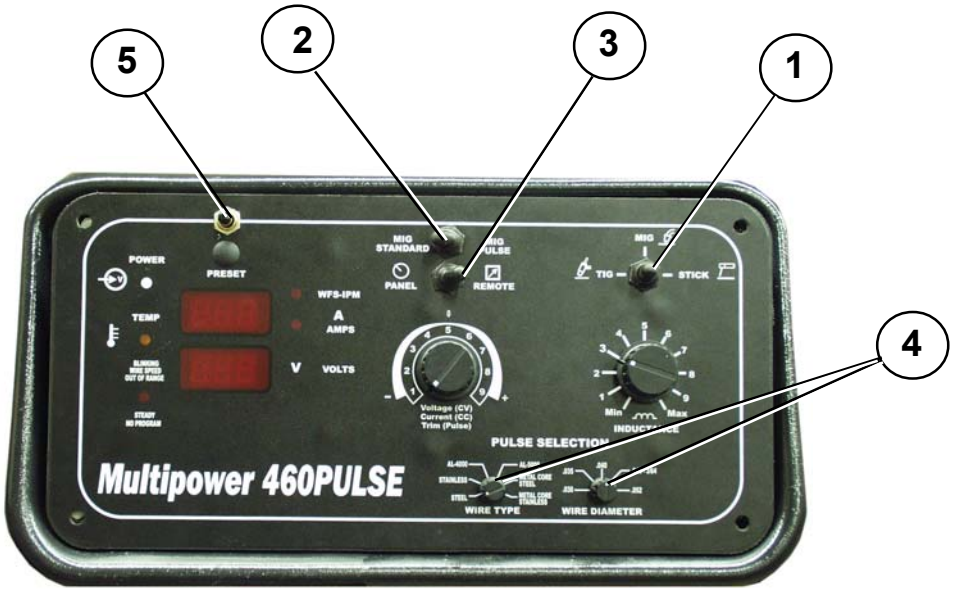


Figure 4-2 Synergic Pulse MIG Setup

NOTE
Place MIG STANDARD/MIG PULSE switch in the MIG STANDARD position when using the Tig, Stick or Arc Gouging process modes.

F. PULSE MIG SETUP

Step 1. Place the WELD PROCESS switch in the MIG (center) position

Step 2. Set the MIG STANDARD/PULSE switch to the MIG PULSE position.

Step 3. Set the PANEL/REMOTE switch to the REMOTE position.

Step 4 Set the PULSE SELECTION switches to the WIRE TYPE and WIRE DIAMETER installed on the wire feeder.

Step 5. Press and release the PRESET button. Turn the wire speed knob on the wire feeder to the desired speed in the top digital display window of the MultiPower 460 Pulse.

Step 6. Turn the voltage knob of the wire feeder to the desired arc voltage in the bottom digital display window of the MultiPower 460 Pulse.

Step 7. Set the shielding gas flow rate to 35 cfh by activating the gas purge switch on the wire feeder or pulling the gun trigger and turning the adjustment knob on the Flowmeter

Step 8 Set the voltage knob on the wire feeder to the "5" or center 12 o'clock position.

Step 9. Connect the work cable to the workpiece and pull the gun trigger to start welding.

Step 10 The voltage knob on the wire feeder becomes the ARC TRIM and is used to fine tune the arc length for best arc performance. Turn the knob clockwise to increase the arc length or counterclockwise to decrease the arc. Trim the wire speed and volts as needed for the desired arc characteristics and weld quality.

G. PULSE PROCESS CONTROL and OPERATION

1. Use a tip-to-work distance (TTW) of 3/8" to 5/8". This refers to the distance between the end of the Mig gun contact tip and the workpiece or weld puddle. The tip-to-work distance can also be used to adjust the stability of the arc. Changes in distance will cause the arc to shorten or lengthen as desired for best results. Excessive tip to work movement can cause arc instability. Maintaining a constant TTW will insure the best arc stability and consistency.

2. For the best arc stability, keep the arc on the front edge of the molten puddle and use a 5 to 10 degree gun angle from the vertical.

3. If the arc is "crackling" or if spatter is excessive lengthen the arc. If the arc is "fluttering" or difficult to control then shorten the arc length.

H. PULSE MIG ARC STABILITY

Many variables can affect the arc stability of pulse MIG welding. Some examples are:

Differences in shielding gas compositions
Differences in weld wire chemistry
Water vs. air cooled guns
Base metal surface condition
Tip-to work distance
Variations on wire feed speed
Wire feedability
Long welding cables
High resistance cables and connections

When adverse conditions are present, the pulse arc stability is sometimes less than desirable. The arc will "crackle" and produce higher than normal spatter levels. This occurs when high resistances in the welding circuit cause changes pulse waveform and average current levels or the wire feed rate is varying excessively. The TRIM knob adjusts the pulse frequency to accommodate small changes in the welding equipment set-up and base material variations to achieve a stable pulse welding condition.

I. SHIELDING GASES

Table 4-3 lists the types of shielding gas mixtures that can be used with the MultiPower 460 Pulse. The wire burn-off rate and synergic operation can vary with changes in shielding gas. The TRIM knob is used to compensate for small changes in shield gas composition.

J. NON-SYNERGIC PULSE OPERATION

The MultiPower 460 Pulse has the unique ability to Pulse MIG weld in the NON-SYNERGIC mode. Non-synergic operation means the pulse parameters can be selected by choosing the WIRE TYPE, WIRE DIAMETER, and presetting a WIRE FEED SPEED on the MultiPower 460 Pulse panel. The pulse frequency or arc length (TRIM) is controlled by the TRIM knob. The TRIM knob is adjustable from the minimum to maximum pulse frequency. By using a combination of adjusting the wire feed speed on the wire feeder and TRIM setting on the MultiPower 460 Pulse, the pulse Mig welding arc can be tune in and stabilized.

The selectable pulse parameters are any combination of WIRE TYPE or WIRE DIAMETER selected using the PULSE SELECTION switches. Not all combinations will produce acceptable pulse characteristics but by using the pulse tables provided in this manual, reasonable pulse combinations can be selected for trial. This will take some trial and error but the added flexibility and expanded pulse range of the non-synergic mode can be beneficial for many welding applications.

There are several unique advantages to Non Synergic pulse mig welding. The Non -Synergic mode of operation permits pulse welding when:

1. A wire feeder without tachometer feedback is used.
2. An "Off the Arc" wire feeder is used
3. The Mig wire type or diameter installed on the wire feeder does not have a pulse synergic line available..
4. Pulse arc characteristics other than those preprogrammed are desired.

To take advantage of the MultiPower 460 Pulse Non-Synergic mode, it is necessary to reposition a jumper plug and/or connector in the main control panel wiring harness. Remove the MultiPower 460 control panel and locate the jumper plug in the wiring harness in the PC board compartment.

Jumper Plug Installed (Factory Shipped)

Synergic Mode - Pulse circuitry is looking for a 1 volt per 100 inches per minute signal to determine the pulse parameters required to make the weld.

Jumper Plug Removed and Harness connected

Non-Synergic Mode - The pulse parameters are determined by the position of the pulse selection switches, the MultiPower 460 Pulse TRIM knob and Wire Feed Speed preset.

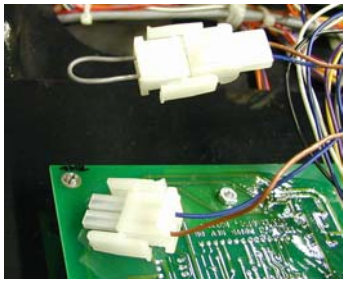


Figure 4-3
Jumper Plug Installed
(Factory Shipped)

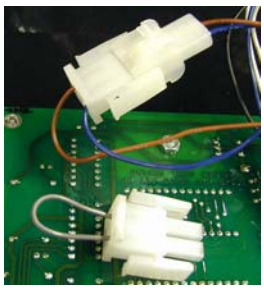


Figure 4-4
Jumper Plug Removed
and Harness Connected

K. PULSE PARAMETERS

Tables 5-3 through 5-8 list the approximate pulse weld parameters for each material and diameter available. These are provided for general reference only. Actual pulse parameters can vary with the equipment set-up, welding application and shielding gas being used. The wire feed speed ranges shown in the tables are the same as programmed into the MultiPower 46 Pulse program. Attempting to weld outside of the suggested speed ranges will result in a "blinking" in synergic line indicator light on the UltraPulse front panel. A "steady" light lite on the panel indicates the wire material and diameter combination selected does not have any pulse data programmed.

Table 5-3 Carbon Steel Pulse Weld Data

.035 Steel				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
75	312	1.70	19	52
125	318	1.70	26	70
175	325	1.70	32	87
225	331	1.70	39	105
275	337	1.70	46	123
325	343	1.70	52	141
375	350	1.70	59	158
425	356	1.70	65	176
475	362	1.70	72	194
525	368	1.70	79	212
575	375	1.70	85	229
625	381	1.70	92	247
675	387	1.70	98	265
725	394	1.70	105	283

.040 Steel				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
75	304	2.40	25	42
125	318	2.40	34	58
175	332	2.40	44	75
225	346	2.40	53	92
275	360	2.40	62	108
325	374	2.40	71	125
375	388	2.40	80	141
425	402	2.40	89	158
475	416	2.40	98	174
525	430	2.40	107	191
575	444	2.40	116	207
625	458	2.40	125	224
675	472	2.40	135	241
725	486	2.40	144	257

.045 Steel				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
125	441	2.20	45	64
175	451	2.20	56	85
225	461	2.20	68	106
275	471	2.20	79	128
325	481	2.20	90	149
375	491	2.20	101	171
425	501	2.20	113	192
475	511	2.20	124	213
525	521	2.20	135	235
575	531	2.20	146	256

.052 Steel				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
100	400	2.50	80	56
175	400	2.50	80	93
250	400	2.50	80	131
325	400	2.50	80	169
400	400	2.50	80	207
475	400	2.50	80	244
550	400	2.50	80	282
625	400	2.50	80	320
700	400	2.50	80	358

1/16 Steel				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
50	518	2.50	45	40
100	524	2.50	80	71
150	529	2.50	114	103
200	534	2.50	148	134
250	540	2.50	182	166
300	545	2.50	216	197
350	550	2.50	250	228
400	556	2.50	284	260

Table 5-4 Stainless Steel Pulse Weld Data

.035 Stainless				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
100	300	1.64	20	55
150	300	1.71	24	71
200	300	1.78	27	88
250	300	1.86	31	104
300	300	1.93	35	120
350	300	2.00	39	136
400	300	2.07	42	153
450	300	2.14	46	169
500	300	2.21	50	185
550	300	2.28	53	201
600	300	2.35	57	218
650	300	2.42	61	234
700	300	2.49	65	250

.040 Stainless				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
100	234	2.80	19	47
150	244	2.80	45	62
200	255	2.80	71	78
250	265	2.80	97	93
300	275	2.80	123	108
350	285	2.80	148	124
400	296	2.80	174	139
450	306	2.80	200	155
500	316	2.80	226	170
550	327	2.80	252	185
600	337	2.80	277	201
650	347	2.80	303	216
700	358	2.80	329	231

.045 Stainless				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
125	305	2.70	58	81
175	325	2.70	65	100
225	345	2.70	71	119
275	365	2.70	77	138
325	385	2.70	84	157
375	405	2.70	90	176
425	426	2.70	97	195
475	446	2.70	103	214
525	466	2.70	110	233
575	486	2.70	116	252
625	506	2.70	122	271

.052 Stainless				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
	NO PROGRAM			

1/16 Stainless				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
50	428	2.00	47	72
100	453	2.00	84	105
150	478	2.00	122	137
200	503	2.00	160	170
250	528	2.00	197	202
300	553	2.00	235	235
350	578	2.00	272	267
400	603	2.00	310	300
450	627	2.00	347	333
500	652	2.00	385	365

Table 5-5 4000 Aluminum Pulse Weld Data

.035 4043 Aluminum				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
200	239	1.80	32	89
250	246	1.80	44	105
300	253	1.80	56	121
350	260	1.80	67	137
400	266	1.80	79	152
450	273	1.80	90	168
500	280	1.80	102	184
550	287	1.80	113	200
600	294	1.80	125	216
650	301	1.80	137	231

.040 4043 Aluminum				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
150	218	1.80	33	70
200	232	1.80	45	89
250	246	1.80	56	108
300	259	1.80	67	127
350	273	1.80	78	146
400	287	1.80	89	165
450	300	1.80	100	184
500	314	1.80	111	203
550	328	1.80	123	222
600	341	1.80	134	242
650	355	1.80	145	261

3/64 4043 Aluminum				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
150	206	2.20	22	138
200	226	2.20	47	156
250	246	2.20	73	174
300	267	2.20	98	192
350	287	2.20	123	210
400	307	2.20	149	228
450	327	2.20	174	245
500	347	2.20	199	263
550	367	2.20	225	281
600	387	2.20	250	299

.052 4043 Aluminum				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
	NO PROGRAM			

1/16 4043 Aluminum				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
175	376	2.30	89	117
225	407	2.30	119	142
275	437	2.30	149	167
325	468	2.30	179	191
375	499	2.30	209	216
425	530	2.30	239	240
475	561	2.30	269	265
525	592	2.30	299	289

Table 5-6 5000 Aluminum Pulse Weld Data

.035 5356 Aluminum				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
200	260	1.70	14	66
250	264	1.70	20	81
300	268	1.70	26	97
350	272	1.70	31	112
400	276	1.70	37	127
450	280	1.70	43	142
500	284	1.70	48	157
550	288	1.70	54	173
600	292	1.70	60	188
650	296	1.70	66	203

.040 5356 Aluminum				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
150	236	1.70	26	53
200	245	1.70	33	70
250	254	1.70	40	86
300	263	1.70	47	103
350	272	1.70	54	119
400	281	1.70	61	135
450	290	1.70	68	152
500	299	1.70	75	168
550	308	1.70	82	185
600	317	1.70	89	201
650	326	1.70	96	218
700	335	1.70	103	234

3/64 5356 Aluminum				
	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
150	248	1.90	33	64
200	260	1.90	44	90
250	271	1.90	54	115
300	282	1.90	64	140
350	294	1.90	75	166
400	305	1.90	85	191
450	316	1.90	95	217
500	328	1.90	106	242

.052 5356 Aluminum				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
	NO PROGRAM			

1/16 5356 Aluminum				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
175	376	2.30	68	96
225	407	2.30	78	116
275	438	2.30	88	135
325	469	2.30	99	155
375	499	2.30	109	175
425	530	2.30	119	194
475	561	2.30	129	214
525	592	2.30	139	234

Table 5-7 Metal Core Carbon Steel Pulse Weld Data

.035 Metal Core CS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
300	300	2.50	39	129
350	306	2.50	49	143
400	313	2.50	58	157
450	320	2.50	68	171
500	326	2.50	77	185
550	333	2.50	86	199
600	340	2.50	96	213

.040 Metal Core CS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
	NO PROGRAM			

.045 Metal Core CS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
100	334	2.50	21	74
175	361	2.50	46	95
250	388	2.50	70	117
325	415	2.50	95	138
400	442	2.50	119	159
475	468	2.50	144	180
550	495	2.50	168	201
625	522	2.50	193	223
700	549	2.50	217	244

.052 Metal Core CS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
75	357	2.70	18	76
125	384	2.70	47	93
175	410	2.70	77	111
225	437	2.70	106	129
275	464	2.70	136	147
325	491	2.70	165	164
375	518	2.70	194	182
425	545	2.70	224	200
475	572	2.70	253	217
525	599	2.70	283	235

1/16 Metal Core CS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
75	388	3.20	9	86
125	411	3.20	53	106
175	435	3.20	97	127
225	459	3.20	141	148
275	483	3.20	186	168
325	507	3.20	230	189
375	531	3.20	274	210
425	555	3.20	318	230
475	579	3.20	363	251
525	603	3.20	407	272

Table 5-8 Metal Core Stainless Steel Pulse Weld Data

.035 Metal Core SS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
	NO PROGRAM			

.040 Metal Core SS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
	NO PROGRAM			

.045 Metal Core SS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
125	343	1.90	32	70
200	357	1.90	52	101
275	370	1.90	72	133
350	384	1.90	92	164
425	397	1.90	112	195
500	411	1.90	133	226
575	425	1.90	153	258
650	438	1.90	173	289
725	452	1.90	193	320

.052 Metal Core SS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
	NO PROGRAM			

1/16 Metal Core SS				
WFS Range (IPM)	Pulse Peak (Amps)	Pulse Width (ms)	Pulse Back-ground (Amps)	Pulse Frequency (Hz)
150	434	2.80	57	143
200	443	2.80	69	167
250	452	2.80	81	191
300	461	2.80	93	214
350	470	2.80	105	238
400	479	2.80	117	262

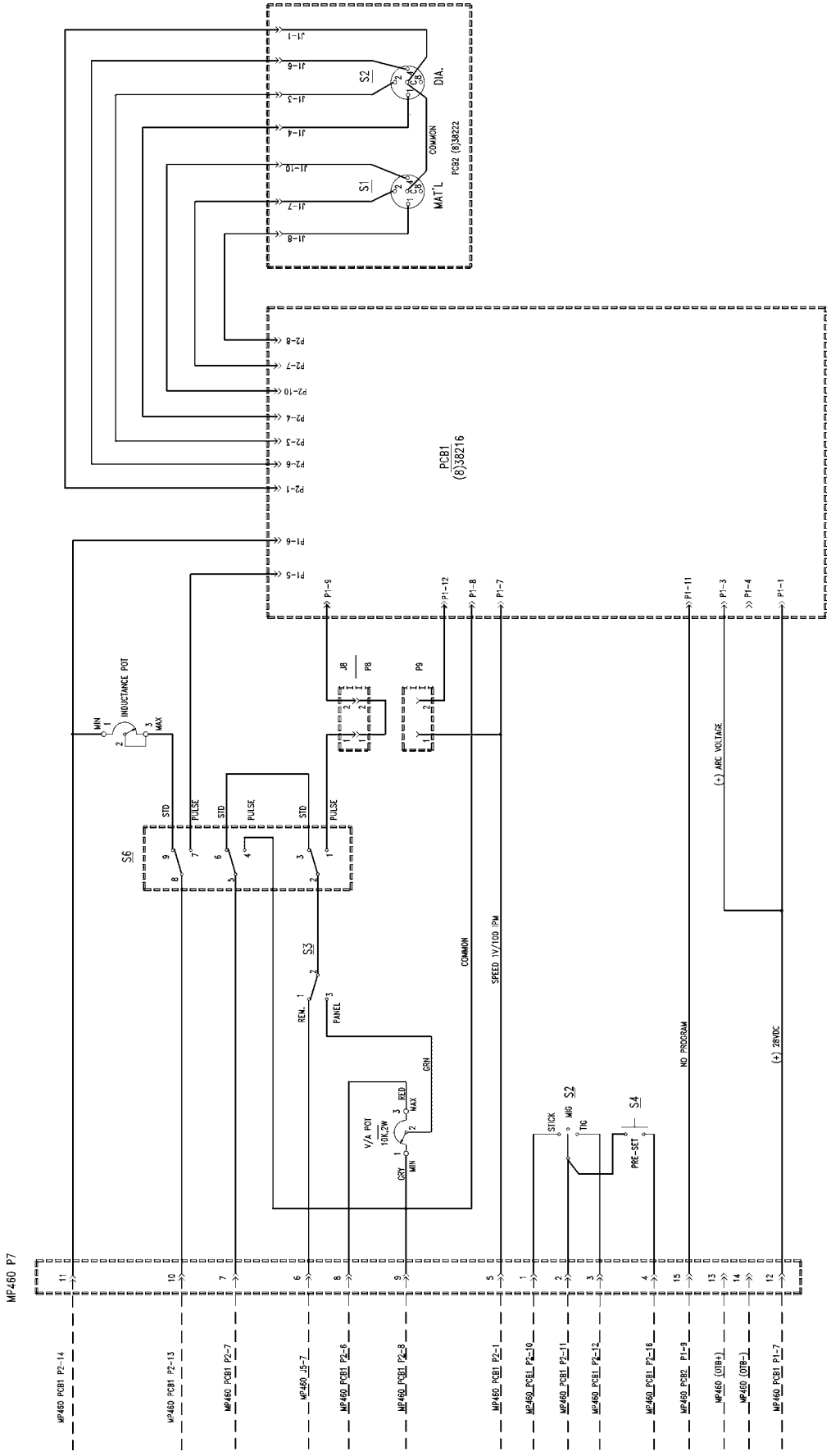


Figure 3. MultiPower 460 Pulse Schematic Diagram

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